Social Media and Disasters: Integrating Social Media into Local Disaster Response

By

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ABSTRACT

With the creation of Facebook and Twitter early in the 21st century, social media began to take over normal routes of communication and has since drastically changed how we seek information. Social media has naturally impacted the field of emergency management and disaster response and disaster recovery with those who are impacted seeking information on these social platforms. Social media utilization in local disaster preparedness and response by local political leaders, NGO's, emergency and relief agencies, and health departments has been limited in implementation and reach due to funding, staffing, training, volume of information involved, and a lack of trust and collaboration. Even with varied implementation in the field of disaster preparedness and response, social media has shifted the needs of individuals worldwide from one-way communication to that of two-way communication, where citizens are now playing the role of journalists. This paper covers local municipalities that have integrated blog networks, Facebook, and/or Twitter post-disaster, lessons learned from their integration, and makes suggestions on how to incorporate social media into local disaster preparedness and disaster response, including the future need for an adaptable social media framework.

Key Words: social media, Facebook, Twitter, disaster preparedness, disaster response, lessons learned

INTRODUCTION

The emergence and rapid growth of social media has impacted how people seek and share information and communicate, creating a need for accurate and timely information and two-way communication. This shift towards easily accessible information is being seen in disaster response and recovery with those impacted using the social media platforms they are most familiar with to connect to loved ones, ask for help, and much more. This paper focuses on lessons learned from the utilization of social media in recent disaster response and recovery efforts. In addition, it makes recommendations regarding the future need for an adaptive, multi-stakeholder framework for the use of social media to aid disaster preparedness and thus also response and recovery on a local level. To adapt to this changing technology and to enhance disaster preparedness and response, I will focus on answering the following questions: 1. Why is it important to utilize social media in the field of local disaster preparedness and response? 2. What recommendations or guidelines should be suggested and/or developed around the utilization of social media in local disaster preparedness and response?

The organization of this literature review is as follows. First, definitions of disaster, disaster preparedness, disaster response, and disaster communication are defined in the context of this paper followed by definitions of social media with a focus on Facebook and Twitter. Then, the discussion flows toward existing research on the need for social media in disaster response with an emphasis on the shift towards two-way communication, the emerging roles of social media in disaster response, and the ways in which social media can be used in risk reduction and response. Next, lessons

learned utilizing Facebook and Twitter in various disasters from Hurricane Katrina in 2005 to Typhoon Haiyan in 2013 are highlighted. Further, limitations and potential issues with social media are discussed, finishing with suggestions for implementation of social media in to a local disaster preparedness and response plan.

BACKGROUND

Communication is the necessary spinal cord of disaster preparedness and response and just as effective communication can reduce the impact of a disaster on the public, poor communication only enhances the impact and delays necessary help to those most at risk. With disasters frequently impairing traditional lines of communication, including landline phone networks, emergency services like 911, and radio and TV broadcasts, more and more individuals are turning to social media for information (Akhgar, Fortune, Hayes, Guerra, & Manso, 2013; Houston, et al., 2014).

A theme seen repeatedly post-disaster is that impacted communities assume a large state and/or federal agency will assist quickly in response and recovery, when that is often not the case. Federal Emergency Management Agency (FEMA) suggests that families pack an emergency preparedness bag with supplies that would last for three days following a disaster, especially for those that live in a hurricane prone area (FEMA, 2012). An emergency preparedness bag should, at minimum, include enough food and water for all family members for 72 hours, plus batteries, flashlights, battery powered or hand crank radio, first aid kit, manual can opener, local maps, and personal sanitation items (FEMA, 2012). Communities must begin to realize that national organizations are not the only ones who will be at work post-disaster. Local community members can take

responsibility for protecting their home and loved ones by serving as the first line of defense as volunteers, organizers, and communication distributors (IFRC, 2000).

Seventy-four percent of adults who are online are using social media with Facebook and Twitter taking first and second as the most utilized platforms (Thomas, Schrock, & Friedman, 2016). Communities must start working together with local, state and national entities and utilizing the limitless power of social media pre- and post-disaster to help as many citizens as possible not only recover but rebuild and thrive, once again.

Key Terms

Disasters

A disaster is as a catastrophic event that can be natural or man-made in origin. Disasters often pose serious health and safety threats and present new environmental, political, geographical, economic and social concerns (Houston et al.,2014; Tim, Pan, Ractham, & Kaewkitipong, 2016). Disaster and disasters and crisis are used interchangeably throughout this paper.

Disaster Preparedness

Disaster preparedness are the measures taken to prepare and even prevent a disaster. The aim of disaster preparedness is to reduce the impact of catastrophic events on vulnerable populations through coordination between community members and response organizations (IFRC, 2000). “Disaster preparedness is a continuous and integrated process resulting from a wide range of activities and resources rather than from a distinct sectoral activity by itself. It requires the contributions of many different

areas- ranging from training and logistics, to health care to institutional development" (IFRC, 2000).

Disaster Response

Disaster response is the assistance during and/or after a disaster to preserve life and provide basic subsistence to those affected by addressing immediate and short term needs (Tim, Pan, Ractham, & Kaewkitipong, 2016; UNOCHA, 2013).

Disaster Communication

Sometimes referred to as crisis communication, disaster communication has recently used various models such as the Crisis and Emergency Risk Communication (CERC) model and the Disaster Communication Intervention Framework (DCIF) to reduce deaths and injuries and encourage community restoration, confidence, coping, recovery, and resilience (Houston et al., 2014). Historically, disaster communication was thought of and limited to mass media and services like the National Weather Service but with the advancement of smart phones and the popularity of social media, disaster communication now includes this two-way communication (Houston et al., 2014).

Social Media

Social media includes an array of Internet-based applications that allow two-way communication and the sharing of resources and information, e.g. Twitter, and Facebook (Houston et al., 2014). The utilization of social media has become widespread and the use of smart phones has been identified as a major factor in part due to its interactivity and dependability, enabling access to platforms like Twitter and Facebook during natural disasters when landlines are inaccessible but mobile networks are operational (Houston et al., 2014; Taylor, 2015). During disasters, people turn to

platforms they are comfortable with. Given the number of worldwide social media users is currently 1.96 billion and expected to grow to over 2.5 billion by 2018, emergency response can no longer ignore the technology and the need for dedicated resources to these outlets before, during, and after disasters (Taylor, 2015).

Facebook

Started in 2004, Facebook is a social networking platform that allows users to create profiles, upload photos, videos, send group and private messages, create groups and events, follow other users, and keep in touch with friends, family members, and colleagues all over the world. With over one billion users, Facebook is the most widely used social media platform and is continuing to grow daily with no end in sight (Haddow and Haddow, 2014).

Twitter

In addition to Facebook, Twitter remains one of the top social media platforms. Launched in 2006, Twitter is a social media platform that is based on “tweets”, short messages of 140 characters or less. Users of Twitter can post tweets, re-tweet others tweets, post photos, follow friends, family, and celebrities alike, and connect their Twitter to other social media platforms like Facebook (Pond, 2016). For context on the speed and spread of Twitter, Twitter users were first, over any mass media, to report the Boston Marathon Bombings and the deaths of Osama Bin Laden and Whitney Houston (Haddow & Haddow, 2014).

Why Social Media

Social media is changing communication around the world, thus strategies for engaging with and leveraging social media must be taken in to account before disasters strike. Utilizing social media for disaster preparedness and response not only enhances social capital and community resilience but makes it easier for responders, volunteers, and community members to provide the help that is needed, giving a two-way communication platform to those impacted and meeting real-time needs (Haddow & Haddow, 2014).

The public and key stakeholders are already harnessing and utilizing social media before, during, and post-disasters with FEMA and The American Red Cross employing social media. However, local community emergency and disaster plans have yet to fully and consistently engage via Facebook and Twitter (Thomas, Schrock, & Friedman, 2016).

With Facebook and Twitter being relevant, easy to use, and providing vast accessibility and scalability, it's no wonder more and more people are accessing these platforms first before any traditional mass media (Houston et al., 2014). Additionally, Facebook and Twitter are being used post-disaster because those are the trusted platforms familiar to the majority of social media users (Haddow & Haddow, 2014).

Social media in disasters can be broken down into two broad categories: to push and pull information. First to push information on platforms such as Facebook and Twitter, acting as an emergency management tool, sending warnings and other pertinent information via messages, Tweets, infographics, and polls. (Lindsay, 2011). The second is to pull information from the platforms such as requests for assistance,

monitoring activities to establish situational awareness, estimate damage, and relay information received to aid and emergency management professionals and organizations (Lindsay, 2011).

With recent congressional interest and discussion on how social media might be utilized to improve federal response and recovery, the Federal Communications Commission (FCC) and FEMA announced the roll out of a Personal Localized Alerting Network (known as PLAN) where the emergency alert system notifications now includes mobile phones (Lindsay, 2011).

METHODS AND RESULTS

This literature review was conducted in two search engines, PubMed and Scopus, via the UNC-Chapel Hill Health Sciences Library. Searching for “social media” OR “social” AND “media” in addition to “disasters” OR “disaster” OR “disaster response” in PubMed yielded 72 results. Searching “social media” AND “disaster response” in Scopus yielded 121 results. All results were thoroughly reviewed and those that didn’t pertain to using social media in the context of disaster response were excluded. After both searches were complete, Facebook and Twitter stood out as the most utilized social media platforms used in disaster response, thus this paper focuses on numerous communities that activated Facebook and/or Twitter post-disaster.

DISCUSSION

Shift Towards Two-Way Communication

Newspapers, television, and radio, are all still utilized during and post-disaster, but this top-down, one-way form of communication is no longer meeting the needs of those impacted by disasters. The public now informs itself of disasters, their impacts on communities, where to go for help, and so much more. This peer to peer, two-way form of communication provided by social media and the Internet profoundly impacts how news is produced, consumed, and shared during disasters (Haddow & Haddow, 2014). Social media thrives off quickly exchanged information and collaboration by those most impacted, which isn't an option in formal disaster response systems and models (Tim, Pan, Ractham, & Kaewkitipong, 2016).

A survey conducted by the Red Cross in 2012 showed online news as the third most utilized source for emergency information, with mobile apps tied for fourth (Haddow & Haddow, 2014). We know people turn to what is familiar to them, so accessing social media for information and posting photos, messages, and personal stories before, during, and after disasters is no surprise. The once passive viewer is now an active participant, a "citizen journalist", with social media taking the role of communicating everyone's voice without control of a top-down agency (Haddow & Haddow, 2014). Research continues to show that traditional disaster response technology is too slow and inadequate with social media allowing those impacted by disasters to work together in real time (Tim, Pan, Ractham, & Kaewkitipong, 2016).

Digital media, especially social media, wasn't a news source for disasters until the terrorist attacks on September 11, 2001. Every disaster since September 11, 2001

has involved more so-called “citizen journalists”, increasing the use of the Internet and social media as main sources of information for disasters (Haddow & Haddow, 2014). From text messaging during China’s SARs epidemic in 2003 to the use of blogs, websites, and message boards during the Indian Ocean Tsunami of 2004 that leveraged mobile technology for donations and relief efforts, digital media began to make a life-saving impact (Haddow & Haddow, 2014). The London Transit Bombings of 2005 used Flickr to share photos. Those same photos were then used by bloggers and police in hopes they may contain information about the terrorists. In 2005, blogs became the main source of information during Hurricane Katrina as printing plants were under water and message boards provided information on shelters and missing persons (Haddow & Haddow, 2014). What was seen in most, if not all, of the previously mentioned disasters was a breakdown in the formally organized command and control infrastructure. During large disasters, like Hurricane Katrina, the formally organized response model was ineffective, leading to more chaos (Tim, Pan, Ractham, & Kaewkitipong, 2016).

The trend towards two-way communication is also playing out in emergency management as the creation of mobile interventions and applications has soared, mainly due to the increase in the need for timely and true information (Haddow & Haddow, 2014). FEMA is also embracing the shift with digital teams launching new tools in 2013 that include a FEMA app with a Disaster Reporter feature, FEMA Social Hub, FEMA LinkedIn page, and U.S. Fire Administration Facebook page (Haddow & Haddow, 2014).

Emerging Roles of Social Media

Social media usage drastically increases during and post-disaster. Below I will explore the roles that social media can and has played during and post-disaster.

Social media can be used in disasters as a listening function including background, reciprocal, and delegated listening, giving a voice to people who normally don't have one (Alexander, 2014). Especially seen in the 2011 Japan Tsunami, social media was used to reach rescuers by those who needed help and to reunite loved ones (Haddow & Haddow, 2014).

Monitoring is a daunting but ever important component of disaster communication and when utilized properly it can improve reactions to events and provide information about the thoughts and actions of those impacted. The main benefit of monitoring is to catch false rumors early on and correct them in a prompt and official manner (Alexander, 2014).

Crowd-sourcing and collaborative development is still a new tactic but is an emerging and important role that social media harnesses. Crowd-sourcing platforms such as Ushahidi rely on contributions, as the more they are used the more popular they become. Thus, they are useful in poorly developed and resource scarce areas where a disaster has occurred (Alexander, 2014). Pictures of the devastation and those in need of help taken in real time and posted to social media are picked up by platforms like Ushahidi and are helping to drive resources to those who need it most. Further, crowd-sourcing helps to give an accurate picture of what is going on at ground zero (Haddow & Haddow, 2014). Additionally, crisis mapping is suited through social media via crowd-sourcing as reports can be received, compiled and then disseminated by and

to many, namely emergency management personnel and search and rescue teams (Alexander, 2014).

Platforms such as Facebook and Twitter help to create a sense of identification with a local community, post-disaster. Additionally, those impacted have been shown to feel more supported and optimistic and were more involved, enhancing voluntarism due to social media (Alexander, 2014).

Social media supports infrastructure and community resilience, building new relationships and deepening others, not only uniting the impacted community but providing a source of psychological first aid (Lindsay, 2011; Taylor, Wells, Howell, & Raphael, 2012). After losing everything from one's home to their job, loved ones, and access to safe and reliable housing, food, and water, the support that online communities provide is immeasurable, often acting as virtual counselors or therapists. Platforms like Facebook and Twitter link people around the world with those affected helping them feel more supported, connected, useful, and hopeful post-disaster (Haddow & Haddow, 2014; Taylor, Wells, Howell, & Raphael, 2012).

Social media platforms can also be utilized for the collection of donations post-disaster. In response to the 2010 Haiti earthquake, Twitter was used in combination with television and text messaging along with the creation of specific disaster hashtags (Alexander, 2014; Haddow & Haddow, 2014).

Hurricane Katrina 2005

On August 29, 2005, Hurricane Katrina made landfall over the Gulf Coast, slamming New Orleans, causing the levee to break and flood 80% of the city (Ostertag

& Ortiz, 2014). With Federal, state, and local officials giving conflicting messages and FEMA downplaying the impact of the massive hurricane, contradicting what citizens and journalists were seeing on the ground, people of New Orleans began blogging their frustrations and concerns (Haddow & Haddow, 2014; Ostertag & Ortiz, 2014). A vast yet loose social network was created via pre-existing bloggers who shifted their prior content to focus on post-Katrina recovery, giving help to new bloggers by connecting, interacting, and aiding in content (Ostertag & Ortiz, 2014).

The blogging network that was created in the aftermath of Katrina not only connected the citizens of New Orleans with each other but to people all over the world. A blogging network of this size and one that used their combined power had never been seen before, influencing the city's civil, political, and legal bodies and creating a new two-way participatory flow of information (Haddow & Haddow, 2014; Ostertag & Ortiz, 2014). In addition to the blogging network, the Broadmoor Civic Association in New Orleans used their on-line bulletin board, contacting neighbors and ultimately leading the way in recovery of homes and businesses (Haddow & Haddow, 2014).

California Wildfires 2007

On October 20, 2007, the Southern California Wildfires began in Malibu, leading to 20 blazes from Santa Barbara to San Diego and resulting in the destruction of 2,200 homes, 500,000 acres, massive evacuations, and over $1 billion in damages (Haddow & Haddow, 2014; Sutton, Palen, & Shklovski, 2008). News media coverage was vast during the fires; however, many residents felt that they were focused on metropolitan areas and thus began sharing photos, videos, and personal stories on community

information sites, online bulletins, blogs, Twitter, and YouTube (Sutton, Palen, & Shklovski, 2008).

Residents not only were able to report on the spread of the fires before first responders arrived but local public TV stations and news outlets used these photos, videos, and Tweets to create an integrated and rolling news source to help to inform and collaborate with emergency responders (Haddow & Haddow, 2014, Sutton, Palen, & Shklovski, 2008). With the citizen journalists of Southern California taking the power into their own hands by giving accurate and timely information, pictures, and personal stories, the media was no longer able to only show the side they wanted to show. A San Diego TV station even went as far as to take down its entire website and replaced it with the citizen-created rolling news source (Haddow & Haddow, 2014). Never had local media outlets overhauled their own methods of news generation and included a rolling citizen-driven information source, utilizing all the Internet and social media available at that time, with residents and first responders deeming this new integration a success (Sutton, Palen, & Shklovski, 2008).

Haiti Earthquake 2010

Near Port-au-Prince, Haiti on January 12, 2010, a 7.0 magnitude earthquake occurred, killing more than 220,000 people and displacing 1.7 million (Haddow & Haddow, 2014). Within minutes, pictures were uploaded and shared on Twitter and Facebook, with thousands more to follow, later being seen around the world on CNN (Oh, Kwon, & Rao, 2010). Twitter was the most active and utilized social media platform after the earthquake, especially in the first and second days' post-disaster, with the third

day showing decreased tweets (Oh, Kwon, & Rao, 2010). Additionally, users on Twitter shared situational information of victims, tweeted about how to adopt orphaned children, and helped emergency responders know where to send supplies and how people could send aid money to Haiti (Oh, Kwon, & Rao, 2010).

The equivalent of “911” in America was set-up overnight by a social media innovator at the State Department, a Swiss graduate student in Boston, a Stanford graduate who devised the original low-cost text messaging communication for hospitals in Africa, and a Haitian engineer (Haddow & Haddow, 2014). This 911 equivalent acted as a help line for those impacted by the hurricane. The text messages that the team received with pleas for help, requests for food, water, medical supplies, etc. were then linked to Ushahidi (Haddow & Haddow, 2014). Over 100 student volunteers at the Fletcher School of Law in Medford, Massachusetts who were trained on how to monitor social media ran a ‘situation room’ where the messages were mapped on a crisis map, pinpointing exactly where help was needed (Haddow & Haddow, 2014). Volunteers in Massachusetts were mapping the information being received on Ushahidi, a platform created for hospitals in Africa to communicate with their HIV patients, and sending this information to relief agencies and search and rescue crews on the ground in Haiti. This literally became a worldwide effort.

In addition to notifying the U.S. Coast Guard, Red Cross, and other relief agencies of where to search for those in need of help, the student volunteers also manually tracked hundreds of online sources, namely Facebook and Twitter, for information on the earthquake, creating 2000 reports added to the Ushahidi Haiti Crisis Map (Haddow & Haddow, 2014). The international community was provided with

access to the intelligence collected via texts and social media and within four days of the earthquake, first-responders began using the Ushahidi Map (Haddow & Haddow, 2014). With FEMA and the U.S. Coast Guard both proclaiming that the Ushahidi Crisis Map was the most accurate tool, Dr. Jeannette Sutton, a disaster sociologist, stated "Haiti was a turning point in terms of the emergence of collaborative and distributed organizations and the recognition that social media serves a broader purpose for emergency managers than tweeting what you are eating for lunch" (Haddow & Haddow, 2014).

Joplin Tornado 2011

On May 22, 2011, an EF-5 tornado tore through Joplin, Missouri, destroying almost 31% of the homes, killing 162 people, and accumulating a loss of over $2 billion with some sources estimating the damage at $3 billion (Burton, Williams, & Williams, 2012; Prevatt et al., 2012). Within two hours of the tornado making landfall, the webpage Joplin Tornado Info (JTI) was founded and within 48 hours JTI was connected and merged with the JTI Facebook page (Burton, Williams, & Williams, 2012). The administrators of the Facebook page quickly realized the need for making this connection and leveraged Facebook as it was the most popular platform and easiest to push information. In less than two hours after the tornado, the first post was made on the JTI Facebook page, it quickly went viral and the JTI Facebook page rapidly amassed 49,000 followers (Burton, Williams, & Williams, 2012).

Relief organizations, faith-based organizations, and news media began posting and sharing posts from the JTI Facebook page, with the informal administrators of the

JTI Facebook page answering each post and Facebook quickly became a large piece of the recovery effort (Burton, Williams, & Williams, 2012; Haddow & Haddow, 2014). "In the beginning many of the community posts were people searching for missing loved ones, asking about shelter and water. One memorable post was the joy we had notifying people that huge water trucks were pulling in to memorial hall" states Rebecca Williams, co-creator of the JTI Facebook page (Burton, Williams, & Williams, 2012). No donations were accepted nor were any churches, charities, or organizations endorsed on the JTI Facebook page and posts were mainly focused around food, water, clothing, and shelter locations, where these posts were then texted to survivors at ground zero (Burton, Williams, & Williams, 2012).

With limited to no power, cable or phone services, Facebook played a major role in helping the tornado survivors and their family members. One resident stated "Once the power came on, it caught me up on everything that had happened. I had no clue what was going on and when that was back up it caught me up. It was just so important" (Burton, Williams, & Williams, 2012). Family members were checking the JTI Facebook page all over the United States and texting the updated information to impacted loved ones in the disaster zone. Additionally, the JTI Facebook page played a crucial role in pointing volunteers to needed recovery efforts (Burton, Williams, & Williams, 2012).

The positive and countless impacts of the JTI Facebook page were noticed by Mashable in 2011 naming the Joplin Tornado Info community as one of the award finalists. Additionally, officials from numerous disaster recovery organizations have shifted from being reluctant to accepting of social media with FEMA leading a nationwide class in 2012 titled 'Social Media for Natural Disaster Response and

Recovery' because of the role and impact that Facebook make in Joplin (Burton, Williams, & Williams, 2012). Burton along with co-creators of the JTI Facebook page, Rebecca and Genevieve Williams, put together a document titled "The Use of Social Media for Disaster Recovery" which is available online at www.Extension.Missouri.edu/Greene (Burton, Williams, & Williams, 2012).

Boston Marathon Bombings 2013

On April 15, 2013, a terrorist attack utilizing two bombs hit the finish line of the Boston Marathon, killing three people and injuring 264 (Haddow & Haddow, 2014). Television was the most used form of media for information post-attack but Facebook and Twitter, namely Twitter, played a major role in psychological first aid and community resilience, with 49% of people following along online and/or on a mobile device (Haddow & Haddow, 2014; Sutton et al., 2015).

The Boston Marathon Bombings created a massive participation by the public with the sharing of information, photos, videos, and personal experiences on social media, eventually leading to the identification of the two men behind the heinous attack (Haddow & Haddow, 2014). "Boston strong", "one Boston", and "pray for Boston" quickly became the themes and hashtags on Facebook and Twitter, connecting the impacted community to other residents and to the world (Haddow & Haddow, 2014; Sutton et al., 2015).

The Boston Police Department and the Federal Bureau of Investigation (FBI) quickly recognized the power and reach of social media and utilized their Twitter accounts to keep the community and the world informed and up to date, even correcting

misleading or false information and answering questions (Haddow & Haddow, 2014). Additionally, The Boston Globe converted its homepage to a live and rolling blog with Tweets and information from various outlets (Haddow & Haddow, 2014). Due to social media and other structures that were in place before the bombings occurred, the Boston Police Department could quickly and effectively use all the content that was available to them without jeopardizing the manhunt or investigation and lead the conversation with citizens in a timely fashion during a critical situation (Haddow & Haddow, 2014).

Typhoon Haiyan 2013

On November 7, 2013, Typhoon Haiyan (also known as Typhoon Yolanda, Super Typhoon Yolanda, and Super Storm Yolanda) made landfall in the Eastern Visayas region of the Philippines, marking it the biggest storm recorded in history, killing over 6,200 people and reaching speeds of 275 km/hr (David, Ong, & Legara, 2016; Deng, Liu, & Deng, 2016). Facebook and Twitter use in the Philippines is quite staggering with 94% of its internet users on Facebook so it was no surprise that these were the main social media platforms post-Haiyan (Popioco, 2015). The World Health Organization (WHO) Representative in the Philippines had no social media presence before Haiyan but established Twitter, Instagram, and Facebook accounts within 24 days' post-landfall and prioritized Facebook as it had more users especially in rural areas (Cool et al., 2015). With all lines of communication shut down for 12 days, survivors had difficultly connecting with friends and family members; however, once the internet came back on Facebook was the source for this information, posting lists of survivors on a regular basis (Cool et al., 2015; Popioco, 2015).

Daily meetings were had between WHO and various partners who worked together not only to align social media messaging but to disseminate information to the United Nations Children's Fund (UNICEF) and the Department of Health (Cool et al., 2015). Additionally, Filipinos are professionals when it comes to monitoring typhoons and began using the hashtag "YolandaPH" in all Haiyan related posts, tweets, pictures, blogs, and videos with many of the photos and videos picked up and used on national TV stations (Popioco, 2015).

Limitations

Most non-profits and organizations site a lack of human power, time, and funding as their main barriers for integrating social media into a disaster preparedness and response plan (Briones, Kuch, Lio, & Jin, 2010). Having staff to maintain the sites, monitor the sites, and review outside sites for information is crucial, plus time and labor intensive (Briones, Kuch, Fisher Liu, & Jin, 2010). If you don't have staff who can stay up to date on the dynamic "social media landscape" then this is an avenue for collaboration with external agencies who focus on monitoring, thus relieving the burden on internal staff (Hadi & Fleshler, 2016). On top of limited staffing and training, with thousands of tweets, posts, pictures, and messages accumulating daily after a disaster, a further drawback to using social media is the "sheer volume" of information that is involved (Alexander, 2014).

Additionally, the risk of rumor propagation and false or misleading information should be taken in to account when using social media as it has the potential to directly impact the public's behavior (Akhgar, Fortune, Hayes, Guerra, & Manso, 2013;

Alexander, 2014). “These rumors may concern specific aspects of the agency response operations, in which case an immediate response should be considered” (Hadi & Fleshler, 2016). For example, images were photoshopped and widely spread post-Hurricane Katrina of 2005 and in Chili post-earthquake of 2010 where numerous rumors were posted and re-tweeted on Twitter, increasing the chaos (Alexander, 2014).

Trust between the community impacted by the disaster and emergency management organizations and the local government is crucial. With social media not providing personal contact, the community must trust the information and warnings being received and emergency professionals must trust citizen-reported information (Mehta, Bruns, & Newton, 2016). Trust also plays a key role between NGOs, government, and aid organizations and between staff and units as they will be collaborating post-disaster for months, sometimes years (Mehta, Bruns, & Newton, 2016).

Another limitation of social media usage in disaster preparedness and response is that people who are most in need of support may be the ones least likely to have access to and the knowledge needed to use social media (Akghar, Fortune, Hayes, Guerra, & Manso, 2013; Alexander, 2014). Further, an overreliance on social media will not only potentially leave out those most at risk but also would be ineffective under prolonged power outages (Lindsay, 2011). The “physical weaknesses” of social media, as displayed in the Great Southwest Blackout of San Diego in 2011 is a perfect example. “Neither the users nor the providers of sites and cellular communication to reach them were ready in any way for such an emergency” (Alexander, 2014). Thus, preparedness will be required by suppliers and the individuals who use the services on

both the technical and social fronts if social media is to be implemented into disaster preparedness and response (Alexander, 2014).

Further, concerns over privacy and who should be monitoring what data, how it is stored, and what data is being collected is also a limitation (Lindsay, 2013; Merchant, Elmer, & Lurie, 2011). Geolocation applications, status alerts, techniques of data mining and ensuring the protection of civil rights are foreseeable issues and should be further explored but is beyond the scope of this paper (Akhgar, Fortune, Hayes, Guerra, & Manso, 2013; Merchant, Elmer, & Lurie, 2011).

It is to be noted that this paper doesn't recommend using social media as the sole communication source in disaster preparedness and response, as social media cannot reach everyone. This paper does suggest using social media in addition to traditional outlets and systems already in use, enhancing local disaster communication and thus serving the entire community. Additionally, social media in disaster preparedness is still an emerging field and needs to be further explored as most available research and information is focused on the utilization of social media in disaster response and not before the actual disaster itself.

Suggestions

The following section will focus on various suggestions from sources already cited in this paper for implementing social media into a community's overall disaster plan from preparedness to response and recovery with my own input on what I feel would make the biggest impact to those in a disaster zone.

A key suggestion for best social media practices in disaster preparedness and response is to first have an active social media presence on Facebook and Twitter before a disaster occurs (Haddow & Haddow, 2014). As seen in the Joplin Tornado and Typhoon Haiyan disasters, social media accounts by key stakeholders were created after the disasters, thus limiting them in their network of followers, relationship and trust with their followers and their communities, and being a connected and transparent media outlet. Of course, transparency, trust, relationship, and follower building happened in both cases post-disaster but think of the bigger impact that they could have had if these accounts had been in place just months beforehand. Additionally, be sure no one person has ownership over the social media accounts and that at least three individuals (what are known as administrators or admins) are well-versed on how to use the social media channels, agency policies on social media use, and those individuals are in consistent communication. Further, be sure that those administrators of the social media accounts are dedicated to monitoring the accounts during the disasters and have adequate and on-going social media training and policy knowledge to ensure consistency.

Once social media accounts have been created, begin building your network of followers, from local citizens and political figures to NGOs, emergency response and police departments, hospitals, local TV stations and journalists, and so forth (Haddow & Haddow, 2014). This will allow for easier communication, networking, and collaboration between all parties prior to a disaster and lead to consistent messages to the public after a disaster has occurred.

Included in building your network are volunteers. Volunteers play a critical piece in not only crisis communication but in emergency management, playing key roles like helping to monitor social media outlets, staffing, and recovery efforts (Haddow & Haddow, 2014). Utilizing your social media platforms to recruit necessary help not only increases your reach, trust, and relationship with the community but serves more people in the greatest time of need.

Utilize a dashboard to compile all the incoming tweets, messages, posts, pictures, etc., like Hootsuite, Athena, or Slándáil. Hootsuite is a dashboard that manages all your social media accounts in a safe and efficient manner and includes options like a mobile app, easy-to-create campaigns, data analytics, and more (Haddow & Haddow; Hootsuite Media Inc., 2017). Athena is a project still in the works that connects citizens, first responders, and local law enforcement agencies via a crisis dashboard and mobile application from pre- to post-disaster using prior implemented social media outlets (Akhgar & Gibson, 2015). Slándáil is also a project in the works that is creating a platform to use tweets, posts, messages, pictures, and so forth pushed on social media, consisting of hardware and software, that will aggregate the data to best inform emergency management professionals during a disaster (Jackson, Aldrovandi, & Hayes, 2015). It is hard to tell which dashboard, Athena or Sládáil, will be the most efficient, well-rounded, inclusive, and easy to use platform, as they are both set to launch in late 2017, but I suggest setting up, becoming familiar with, training all necessary staff, and testing out either Hootsuite, Athena, or Sládáil before a disaster occurs.

CONCLUSIONS

Social media has drastically impacted how we interact with others since the launch of Facebook in 2004, quickly followed by Twitter in 2006, amassing billions of active users to date. We know that people turn to what is familiar to them for information, especially during disasters and with Facebook and Twitter being the top two utilized social media platforms, those impacted by disaster are going there first for information. However, local stakeholders such as emergency response and management professionals, political leaders, NGOs, etc. have been slow to adapt, trust, and utilize this source of communication and when the platforms have been incorporated, conflicting messages with State and Federal officials has occurred.

From Hurricane Katrina's blog network to rolling-citizen driven information replacing local media stations during the California Wildfires of 2007 to Twitter's integral role during the Haiti Earthquake and Facebook usage during the Joplin Tornado, we can no longer ignore the power and reach of social media and must integrate them into all stages of emergency and disaster plans.

However, social media isn't the end all, be all. Numerous limitations to be further explored and taken in to account include staffing, training, funding for positions, rumor propagation, trust, transparency, privacy, and potentially not reaching those most in need. Most city and county health departments and local and state emergency management organizations don't have the funding to pay staff to lead their social media presence; however, this could be a place to utilize skilled and trained volunteers. The risk of rumor mills is of serious and constant concern and must be considered as citizen-driven posts spread across the world in a matter of seconds. Additionally, when

cell towers go down and/or cell service goes out post-disaster, social media is rendered useless, in addition to all online media and text messaging. Working with cell phone service providers and those that maintain the networks is recommended along with avoiding an over-reliance on only social media platforms in disaster response and recovery. What is of most concern, in my opinion, is privacy in this digital age and social media utilization in disaster preparedness and response. What data is being collected, how is it being stored, who has access, are the specific locations of those most at risk being protected? All important questions to answer and an area for future research and focus.

This paper recommends enhancing local preparedness and response by creating social media accounts, namely Facebook and Twitter, and adding them to an overall community emergency preparedness and disaster plan. Social media can't reach everyone and when power and internet go down, these platforms become useless so adding social media as an extra layer of communication will not only enhance reach and meet citizens where they are but decrease the overreliance on one form of information pushing, i.e. top-down, one-way communication. Once the social media accounts are created then the networking, collaboration, and community trust building can begin.

Future recommendations include using a dashboard or platform like Hootsuite, Athena, or Slándáil, to help sort, aggregate, and disseminate the incoming information and provide a further tool and layer of communication and collaboration. However, the creation and integration of these platforms requires more research and is beyond the scope of this paper.

Social media harnesses almost unlimited power and has changed how we interact, communicate, and seek information. For key stakeholders in local disaster preparedness and response to not implement this two-way communication would not only be unwise and unethical but narrow-minded, ultimately leading to more destruction, devastation, illness, death, and prolonged recovery and resilience of already at-risk communities.

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